REMARKS

This Amendment is submitted in response to the Office Action dated April 1, 2010. The Office Action objected to Claim 20; and rejected Claims 11, 12, 14-18 and 20-23 under 35 U.S.C. §103 in view of U.S. Publication No. 2001/0031509 to Yamazaki et al. ("Yamazaki") in view of U.S. Patent No. 6,285,039 to Kobori et al. ("Kobori"). Applicants respectfully submit that the rejections should be withdrawn for at least the reasons that are set forth in detail below. The Commissioner is hereby authorized to charge deposit account 02-1818 for any fees which are due and owing.

With respect to the objection of Claim 20, this claim has been amended as previously provided and as such is believed to be responsive to the Patent Office's comments with respect to same. Therefore, the objection should be withdrawn.

With respect to the alleged obviousness rejection, the Patent Office has primarily relied on the Yamazaki reference. Applicants respectfully submit that Yamazaki is distinguished from the claimed invention. Of the pending claims, claims 11, 18, 20, and 23 are the sole independent claims where each of the independent claims recite an intermediate layer between the light emitting layers.

In the organic EL device as embodied by the claimed invention, with the intermediate layer provided between the light emitting layers, it is ensured that the energy of excitons generated by re-coupling of electric charges in each light emitting layer is less liable to be transferred between the light emitting layers. Therefore, a lowering in luminous efficacy of a specified light emitting layer due to the transfer of the energy of the excitons is prevented from occurring. Accordingly, the balance between the luminous efficacies of the respective color light emitting layers is maintained. See, Published Application, paragraph [0007].

Particularly, the energy of the excitons as above-mentioned is liable to be transferred into a layer in which a material with a small HOMO (Highest Occupied Molecular Orbital)-LUMO (Lowest Unoccupied Molecular Orbital) energy gap is present, with the result of a lowering in the luminous efficacy of a light emitting layer which has a great HOMO-LUMO energy gap. In view of this, it is preferable that the HOMO-LUMO energy gap in the intermediate layer provided between the light emitting layers is set to be greater than the HOMO-LUMO energy gaps of the materials constituting the light emitting layers adjacent to the intermediate layer. This configuration ensures that the transfer of the above-mentioned energy between the light emitting

layers is securely prevented from occurring. In addition, the energy is prevented from being transferred into the intermediate layer to be released in the intermediate layer. Incidentally, the HOMO-LUMO energy gap in the intermediate layer may not necessarily be greater than the HOMO-LUMO energy gaps of all the materials constituting the light emitting layers adjacent to the intermediate layer; in the case where there is a material having a HOMO-LUMO energy gap so small as to permit easy transfer of the energy of the excitons, it suffices that the HOMO-LUMO energy gap in the intermediate layer is greater than the HOMO-LUMO energy gap of this material. It should be noted here, however, that if the HOMO-LUMO energy gap in the intermediate layer is greater than the HOMO-LUMO energy gaps of all the materials constituting the light emitting layers adjacent to the intermediate layer, the above-mentioned energy transfer between the light emitting layers is securely prevented from occurring. See, Published Application, paragraph [0008].

Furthermore, in the organic EL device as embodied by the claimed invention, electrons or holes are transported into each light emitting layer through the light emitting layer adjacent thereto. Therefore, it is preferable for the intermediate layer provided between the light emitting layers to have an electron transporting property or a hole transporting property. This promises easy transportation of electrons or holes into the light emitting layers adjacent to the intermediate layer. Therefore, in the case where the light emitting layer provided on the cathode side is weak in luminous intensity, provision of an intermediate layer having both a hole transporting property and an electron blocking property on the anode side of this light emitting layer makes it possible to increase the amount of the holes transported into the light emitting layer provided on the cathode side and to restrict the amount of the electrons transported into the light emitting layer provided on the anode side, whereby the probability of re-coupling between electrons and holes in the light emitting layer under consideration can be increased, and the luminous intensity can be enhanced. See, Published Application, paragraph [0009].

On the other hand, in the case where the light emitting layer provided on the anode side is weak in luminous intensity, provision of an intermediate layer having both an electron transporting property and a hole blocking property on the cathode side of the light emitting layer makes it possible to increase the amount of the electrons transported into the light emitting layer provided on the anode side and to restrict the amount of the holes transported into the light emitting layer provided on the cathode side, whereby the probability of re-coupling between

electrons and holes in the light emitting layer under consideration can be increased, and the luminous intensity can be enhanced. See, Published Application, paragraph [0009].

As further defined in claim 14, an intermediate layer having both a hole transporting property and an electron blocking property is provided between the green light emitting layer and the blue light emitting layer. This ensures that the injection of holes into the blue light emitting layer provided on the most cathode side can be promoted, and the injection of electrons into the green light emitting layer can be restricted, so that a good probability of re-coupling between holes and electrons in the blue light emitting layer is secured. This also provides a well-balanced white light emission. In this instance, it is preferable for the LUMO energy level (energy value) in the intermediate layer to be higher than the LUMO energy level of an electron transporting component serving as a host material in the green light emitting layer, for providing a barrier against the injection of electrons into the green light emitting layer. See, Published Application, paragraph [0011].

As further defined in claim 16, an intermediate layer having both a hole transporting property and an electron blocking property may be provided between the red light emitting layer and the green light emitting layer. This ensures that the injection of holes into the blue light emitting layer and the green light emitting layer which are provided on the cathode side relative to the intermediate layer is promoted, the injection of electrons into the red light emitting layer can be restricted, and the probabilities of re-coupling between holes and electrons in the blue light emitting layer and the green light emitting layer are secured. This also provides a well-balanced white light emission. In this instance, it is preferable for the LUMO energy level in the intermediate layer to be higher than the LUMO energy level of an electron transporting component in the red light emitting layer, for providing a barrier against the injection of electrons into the red light emitting layer 12. This configuration makes it possible to restrict the injection of electrons into the red light emitting layer. See, Published Application, paragraph [0012].

In contrast, the organic films (or clusters) 401 and 402 described in Yamazaki function as charge traps. In Yamazaki, electron reached to the organic film 401 is trapped therein (electron trap), where a hole reached to the organic film 402 is trapped therein (hole trap). Thereby, recombination occurs in the energy gap between LUMO of the electron trap and HOMO of the hole trap. Recombination region is formed only in this gap, so that the light-emitting device in

Yamazaki only emits a single color. The light-emitting device in Yamazaki cannot emit lights of different colors from the light emitting layers. Therefore, Yamazaki does not teach or suggest any layers functioning as the intermediate layer as claimed, and thus is distinguished from the claimed invention for at least this reason. Moreover, the Patent Office cannot solely rely on the secondary reference to remedy the deficiencies of Yamazaki, even if properly combinable.

Accordingly, the obviousness rejection should be withdrawn at least in view of same.

For the foregoing reasons, Applicant respectfully submits that the present application is in condition for allowance and earnestly solicits reconsideration of same.

Respectfully submitted,

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